

International
IR Rectifier

30ETH06SPbF
30ETH06-1PbF

Hyperfast Rectifier

Features

- Hyperfast Recovery Time
- Low Forward Voltage Drop
- Low Leakage Current
- 125°C Operating Junction Temperature
- Dual Diode Center Tap
- Lead-Free ("PbF" suffix)

$$t_{rr} = 28\text{ns typ.}$$

$$I_{F(AV)} = 30\text{Amp}$$

$$V_R = 600\text{V}$$

Description/ Applications

State of the art Hyperfast recovery rectifiers designed with optimized performance of forward voltage drop, Hyperfast recover time, and soft recovery.

The planar structure and the platinum doped life time control guarantee the best overall performance, ruggedness and reliability characteristics.

These devices are intended for use in PFC Boost stage in the AC-DC section of SMPS, inverters or as freewheeling diodes.

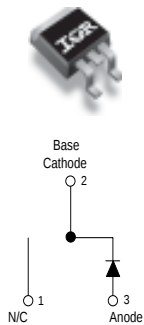
The IR extremely optimized stored charge and low recovery current minimize the switching losses and reduce over dissipation in the switching element and snubbers.

Absolute Maximum Ratings

Parameters	Max	Units
V_{RRM} Peak Repetitive Reverse Voltage	600	V
$I_{F(AV)}$ Average Rectifier Forward Current @ $T_C = 103^\circ\text{C}$	30	A
I_{FSM} Non Repetitive Peak Surge Current @ $T_J = 25^\circ\text{C}$	200	
T_J Operating Junction Temperature	- 65 to 125	$^\circ\text{C}$
T_{STG} Operating Storage Temperature	- 65 to 150	

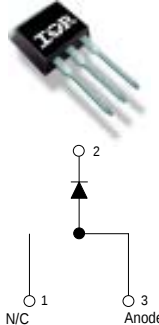
Case Styles

30ETH06SPbF



D²PAK

30ETH06-1PbF



TO-262

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Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

Parameters	Min	Typ	Max	Units	Test Conditions
V _{BR} , V _r Breakdown Voltage, Blocking Voltage	600	-	-	V	I _R = 100μA
V _F Forward Voltage	-	2.0	2.6	V	I _F = 30A, T _J = 25°C
	-	1.34	1.75	V	I _F = 30A, T _J = 150°C
I _R Reverse Leakage Current	-	0.3	50	μA	V _R = V _R Rated
	-	60	500	μA	T _J = 150°C, V _R = V _R Rated
C _T Junction Capacitance	-	33	-	pF	V _R = 600V
L _S Series Inductance	-	8.0	-	nH	Measured lead to lead 5mm from package body

Dynamic Recovery Characteristics @ T_J = 25°C (unless otherwise specified)

Parameters	Min	Typ	Max	Units	Test Conditions
t _{rr} Reverse Recovery Time	-	28	35	ns	I _F = 1.0A, di _F /dt = 50A/μs, V _R = 30V
	-	31	-		T _J = 25°C
	-	77	-		T _J = 125°C
I _{RRM} Peak Recovery Current	-	3.5	-	A	T _J = 25°C
	-	7.7	-		T _J = 125°C
Q _{rr} Reverse Recovery Charge	-	65	-	nC	T _J = 25°C
	-	345	-		T _J = 125°C

Thermal - Mechanical Characteristics

Parameters	Min	Typ	Max	Units
T _J Max. Junction Temperature Range	- 65	-	125	°C
T _{Stg} Max. Storage Temperature Range	- 65	-	150	
R _{thJC} Thermal Resistance, Junction to Case Per Leg	-	0.7	1.1	°C/W
R _{thJA} ① Thermal Resistance, Junction to Ambient Per Leg	-	-	70	
R _{thCS} ② Thermal Resistance, Case to Heatsink	-	0.2	-	
Weight	-	2.0	-	g
	-	0.07	-	(oz)
Mounting Torque	6.0	-	12	Kg-cm
	5.0	-	10	lbf.in
Marking Device	30ETH06S		Case style D ² Pak	
	30ETH06-1		Case style TO-262	

① Typical Socket Mount

② Mounting Surface, Flat, Smooth and Greased

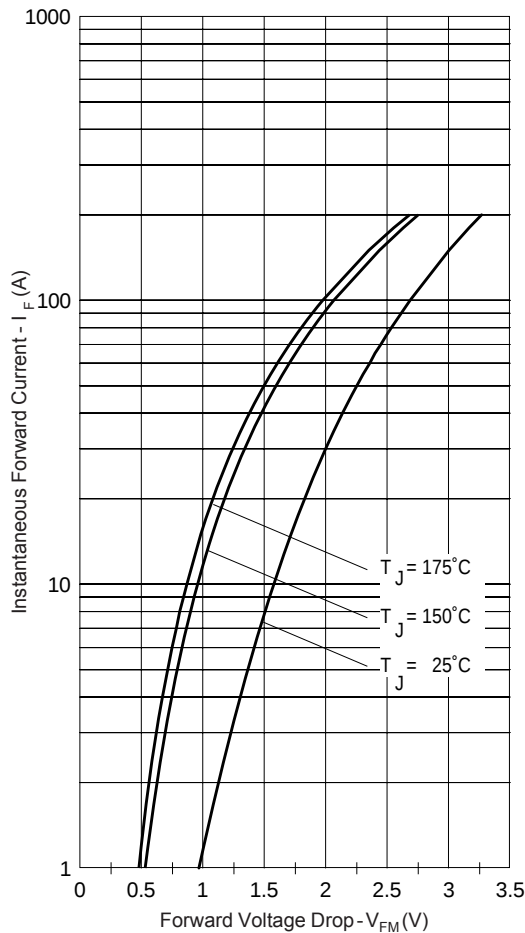


Fig. 1 - Typical Forward Voltage Drop Characteristics

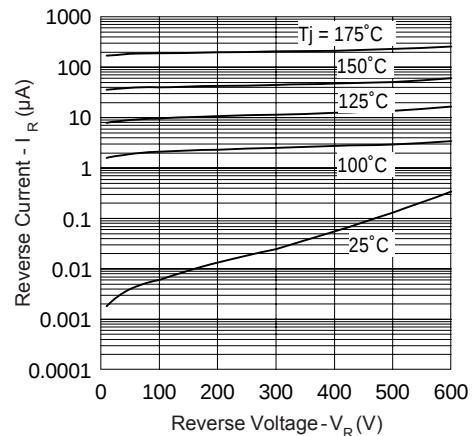


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

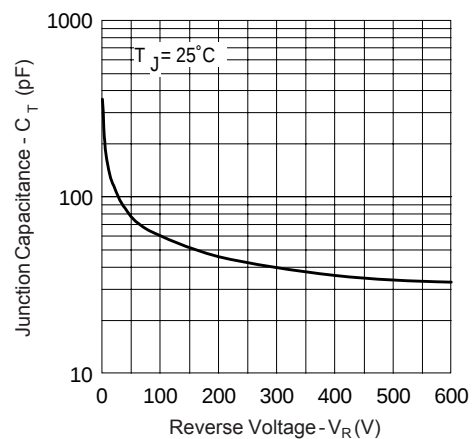


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

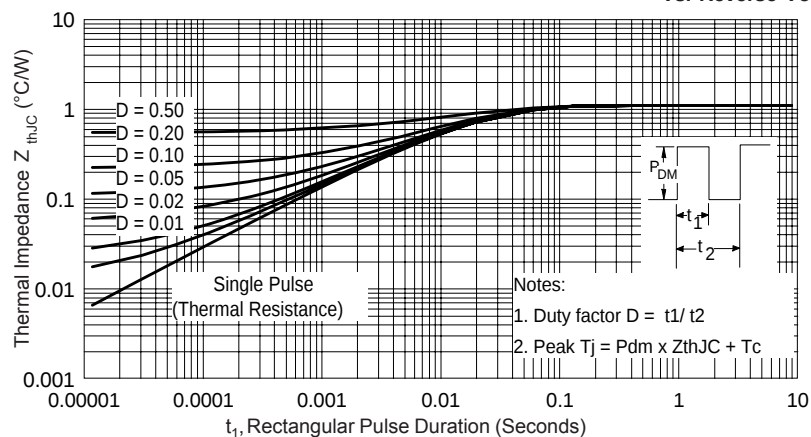


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

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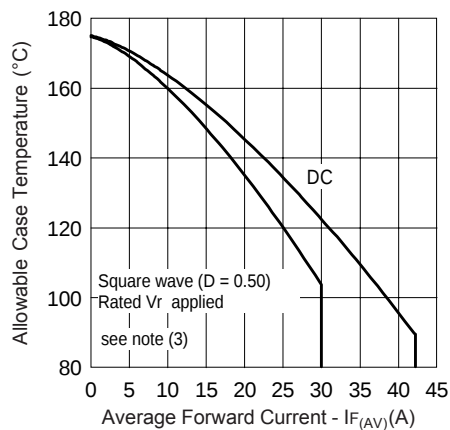


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

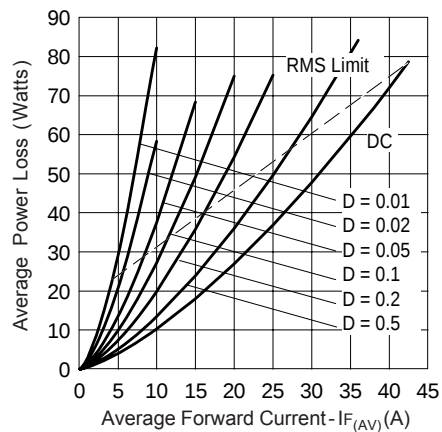


Fig. 6 - Forward Power Loss Characteristics

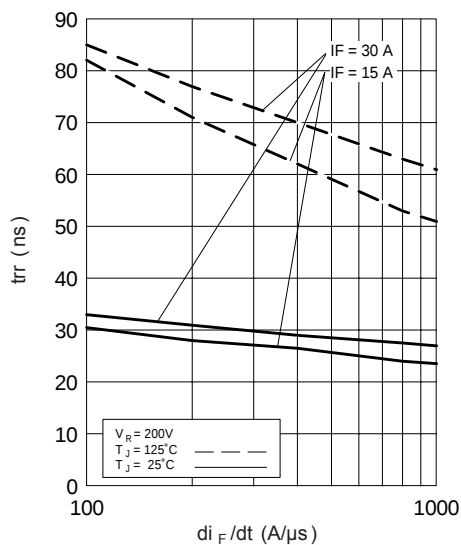


Fig. 7 - Typical Reverse Recovery vs. di_F/dt

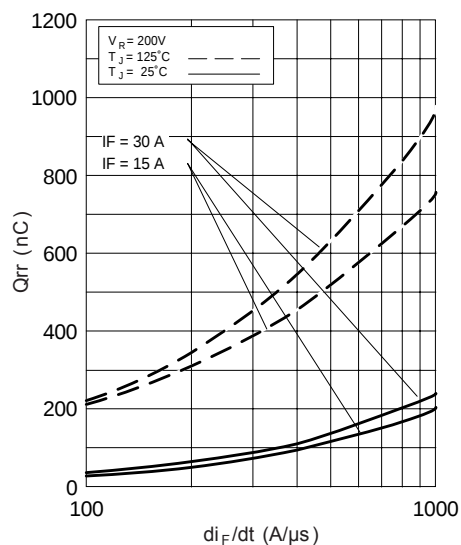


Fig. 8 - Typical Stored Charge vs. di_F/dt

- (3) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
 Pd = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);
 Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1}$ = rated V_R

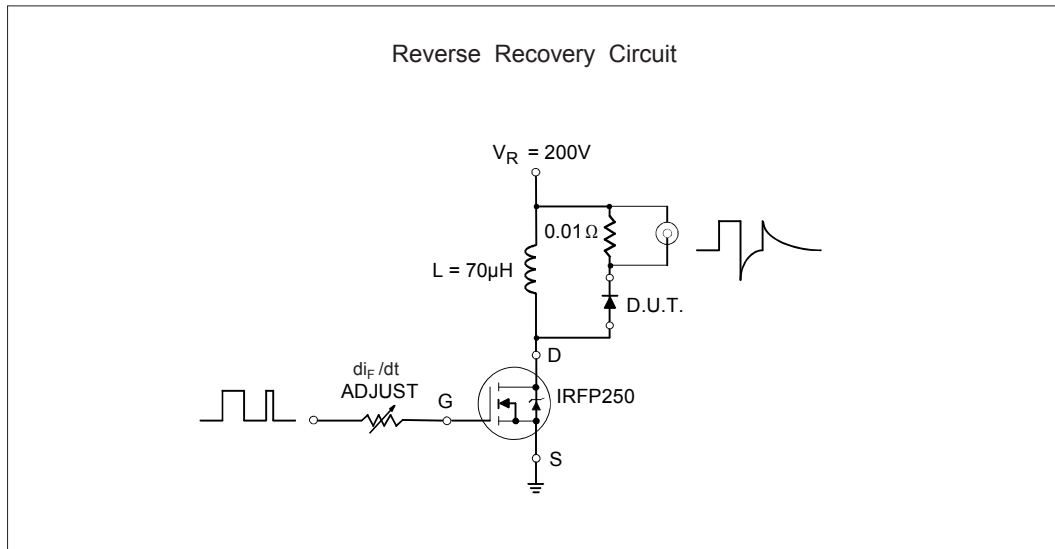


Fig. 9- Reverse Recovery Parameter Test Circuit

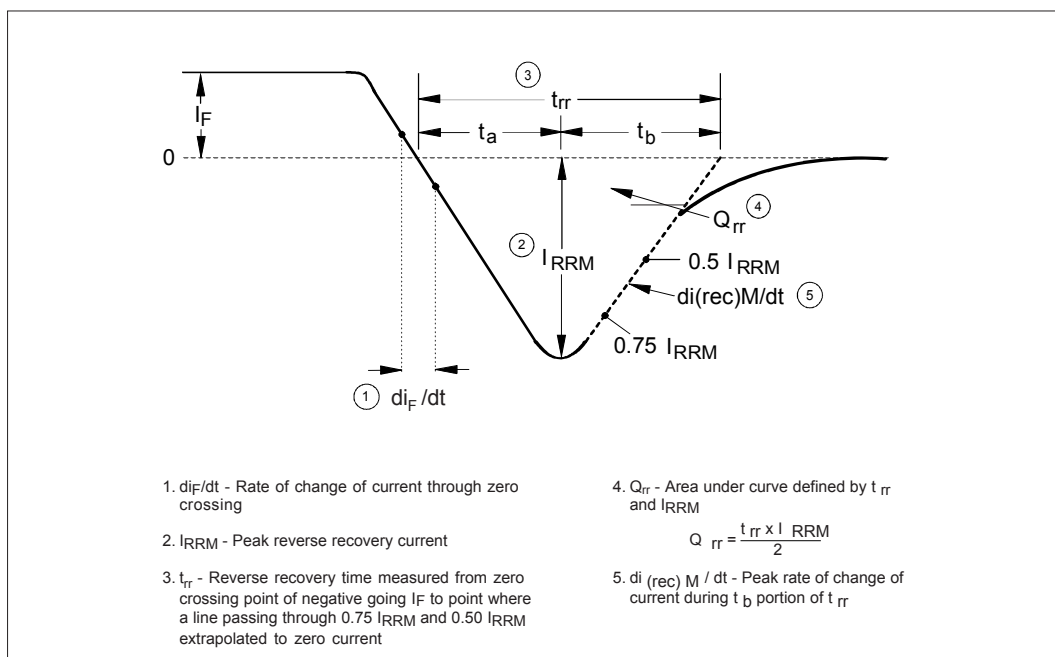


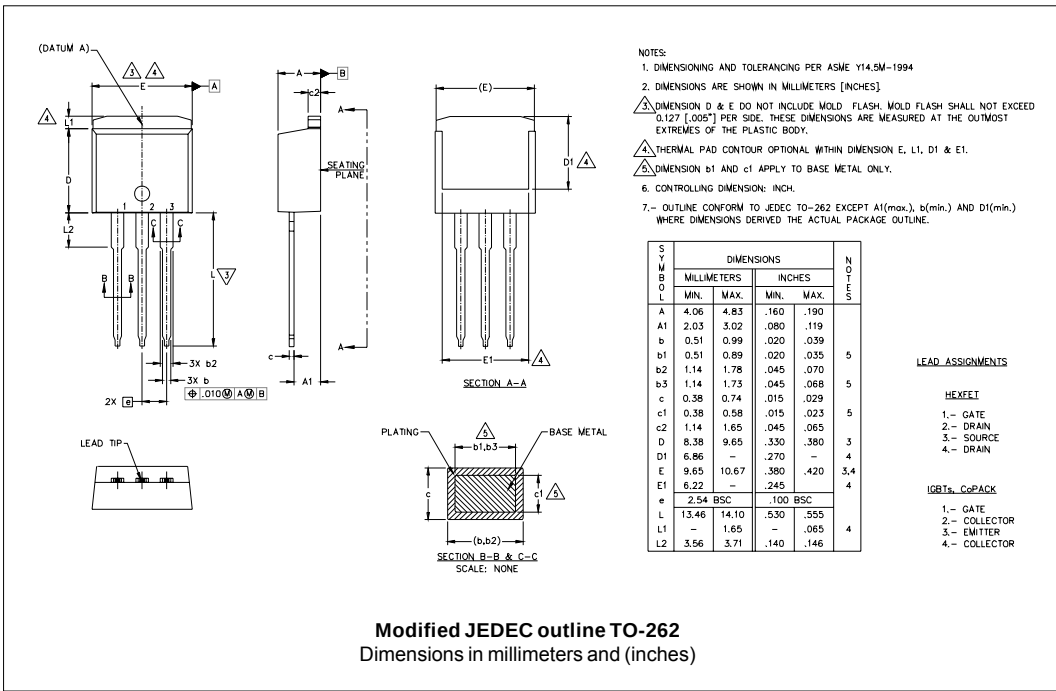
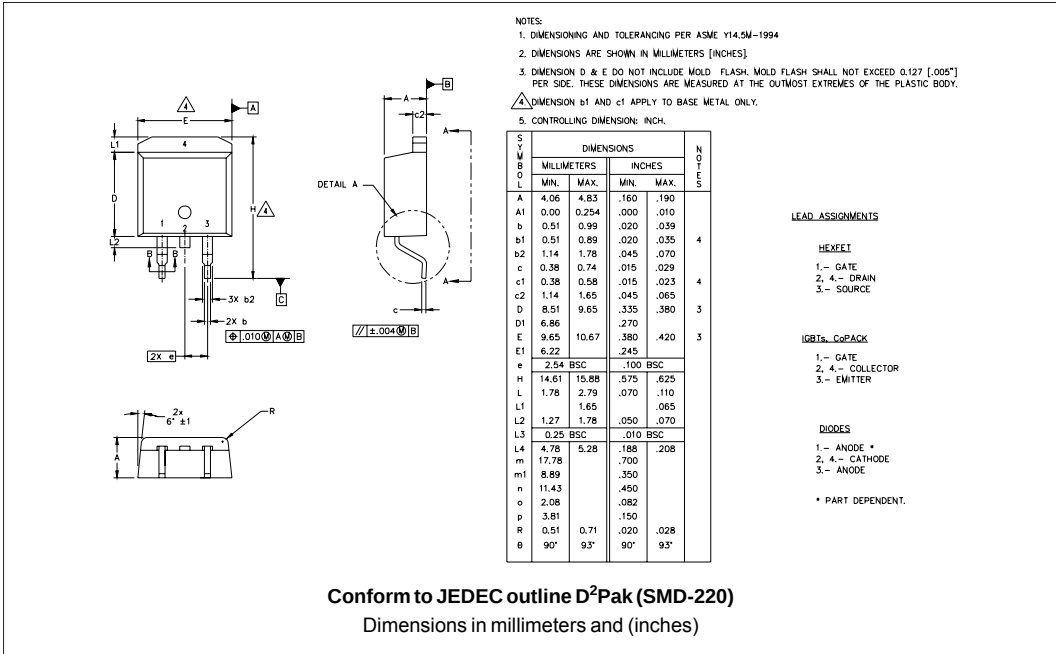
Fig. 10 - Reverse Recovery Waveform and Definitions

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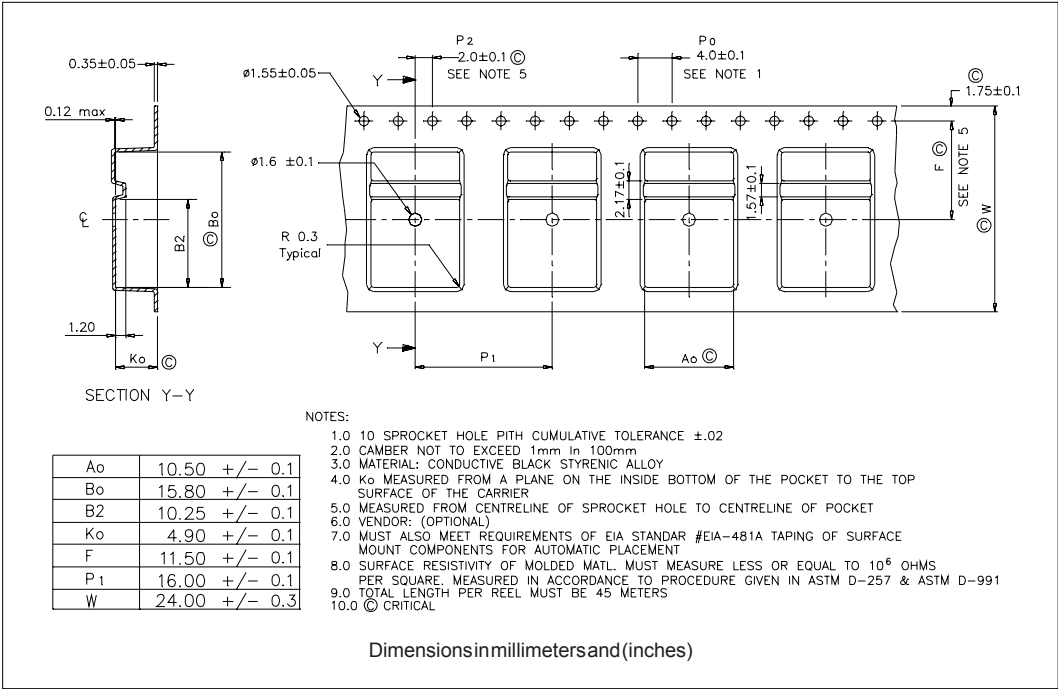
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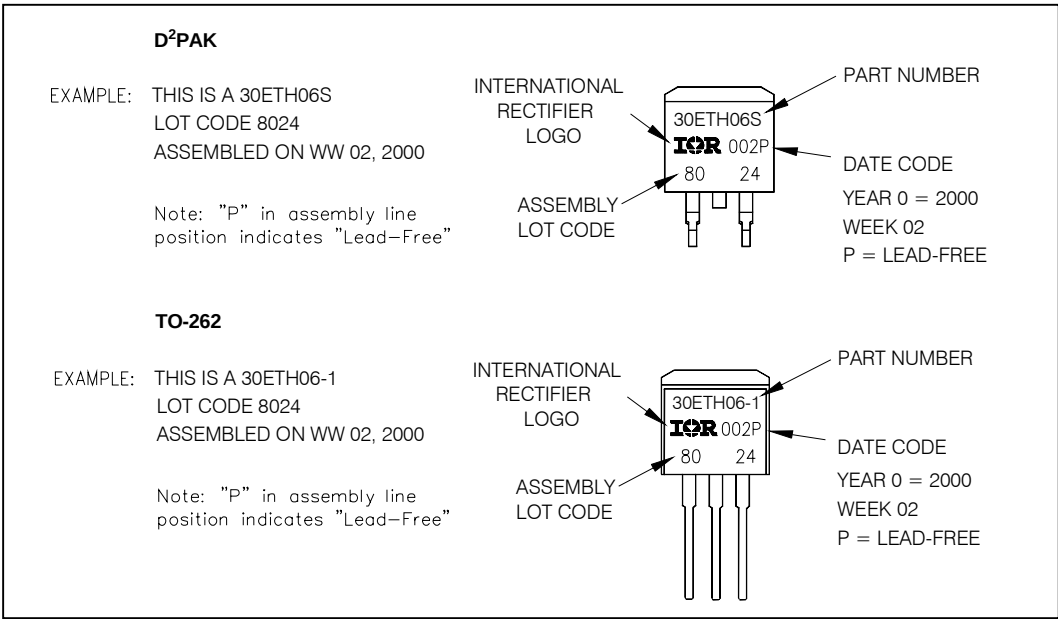
Outline Table



Tape & Reel Information



Part Marking Information



30ETH06SPbF, 30ETH06-1PbF

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Ordering Information Table

Device Code	30	E	T	H	06	S	TRL	PbF
	1	2	3	4	5	6	7	8
1	-	Current Rating (30 = 30A)						
2	-	E = Single Diode						
3	-	T = TO-220, D ² Pak						
4	-	H = HyperFast Recovery						
5	-	Voltage Rating (06 = 600V)						
6	-	• S = D ² Pak						
		• -1 = TO-262						
7	-	• none = Tube (50 pieces)						
		• TRL = Tape & Reel (Left Oriented, for D ² PAk package)						
		• TRR = Tape & Reel (Right Oriented, for D ² PAk package)						
8	-	• none = Standard Production						
		• PbF = Lead-Free						

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level and Lead-Free.
Qualification Standards can be found on IR's Web site.

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